

CLAIMS

What is claimed is:

1. An automated kitchenware washing tank comprising:

A tank with a wall that defines an enclosure for holding a fluid for washing kitchenware;

outlets in the wall for directing fluid into the tank;

5 an intake opening in the tank;

A pump system comprising a pump and fluid conduit system coupling the pump between the intake opening and the outlets, whereby the pump is adapted to pump fluid from within the tank through the intake opening into the pump system and through the outlets into the tank at a flow rate; and

10 A control system comprising a controller coupled to the pump system for causing the pump to pump fluid at least two different flow rates through the outlets, and controls to select between the at least two different flow rates.

2. The automated kitchenware washing tank of Claim 1 wherein the control system further comprises a controller programmed with at least one preset program and wherein the control system allows the preset program to be selected and operated, the program controlling the controller to operate the pump through at least two timed
5 cycles, with different flow rates.

3. The automated kitchenware washing tank of Claim 2 further comprising a cleaner dispenser for dispensing cleaner into the fluid in the tank to facilitate cleaning the kitchenware and wherein the control system is interfaced to the cleaner dispenser for automatically causing the cleaner dispenser to dispense cleaner into the fluid.

4. The automated kitchenware washing tank of Claim 2 further comprising a heater for heating the fluid within the tank and wherein the controller is interfaced to

the heater to cause the heater to vary the temperature of the fluid within the tank between the cycles.

5 5. The automated kitchenware washing tank of Claim 1 wherein the wall of the tank includes a bottom wall and an enclosure wall that extends upwardly from the bottom wall, the enclosure wall having at least one angled portion facing at least partially downwardly, and at least some of the outlets being located on the angled portion.

6. The automated kitchenware washing tank of Claim 1 wherein the enclosure wall of the tank has at least two angled portions facing generally downwardly, wherein the outlets are discharge openings and at least some of the discharge openings are formed in each of the angled portions of the wall to direct the fluid generally downwardly into the tank.

7. The automated kitchenware washing tank of Claim 6 wherein the at least two angled portions comprise two angled portions formed on opposed portions of the enclosure wall.

8. The automated kitchenware washing tank of Claim 7 wherein all of the discharge openings are formed in the angled portions of the enclosure wall.

9. The automated kitchenware washing tank of Claim 7 wherein each angled portion of the wall has at least two rows of discharge openings and at least two discharge openings per row.

10. The automated kitchenware washing tank of Claim 9 wherein the angled portions are at about 75 degrees from horizontal, wherein the discharge openings direct fluid into the tank in a crossing pattern.

11. The automated kitchenware washing tank of Claim 10 wherein each angled portion of the enclosure wall has at least three rows of discharge openings and at least three discharge openings per row.

12. The automated kitchenware washing tank of Claim 7 further comprising an overflow formed on the enclosure wall by an elongated cutaway portion in the upper portion of the enclosure wall.

13. The automated kitchenware washing tank of Claim 8 further comprising a drain having a drain opening in one of the walls with a drain pipe connected to the drain opening to allow the tank to be emptied and a valve coupled to the drain and being operable to open and close the drain, thus allowing the tank to be emptied and
5 filled.

14. The automated kitchenware washing tank of Claim 7 further comprising a heater to heat the fluid in the tank, a heat sensor to detect the temperature of the fluid in the tank, a fluid level sensor to detect whether the fluid is above or below a desired level in the tank.

15. The automated kitchenware washing tank of Claim 14 wherein one of the fluid conduits comprises a plenum that is coupled to the intake opening to form a sump and the heater is disposed in the sump, and wherein the tank further comprises a perforated closure that is hingedly attached to the tank to restrict food debris and
5 dishware from entering the intake opening.

16. An automated kitchenware washing tank, comprising:

A tank comprising a bottom wall and at least four upward walls extending upwardly from the bottom wall, the tank being adapted to hold a fluid for washing kitchenware;

5 At least one of the upward walls having an angled portion facing generally downwardly into the tank;

 Discharge openings for directing fluid into the tank, at least some of the discharge openings being formed in the angled portion;

 An intake opening in the tank; and

10 A pump system comprising a pump and fluid conduit system coupled between the discharge openings and the intake opening, wherein the pump pumps the fluid from the intake opening through the fluid conduits and out of the discharge openings.

17. The automated kitchenware washing tank of Claim 16 wherein at least two of the upward walls have angled portions facing generally downwardly into the tank, and at least some of the discharge openings being located in the angled portions.

18. The automated kitchenware washing tank of Claim 17 wherein the at least two upward walls having angled portions comprise two opposing upward walls.

19. The automated kitchenware washing tank of Claim 18 wherein two of the upward walls are sidewalls, one of the upward walls is a front wall and one of the upward walls is a back wall and the front and back walls have the angled portions.

20. The automated kitchenware washing tank of Claim 18 wherein two of the upward walls are sidewalls, one of the upward walls is a front wall and one of the upward walls is a back wall and the sidewalls have the angled portions.

21. The automated kitchenware washing tank of Claim 20 wherein all of the discharge openings are formed in the angled portions of the sidewalls.

22. The automated kitchenware washing tank of Claim 18 wherein each angled portion of the upward walls has at least two rows of discharge openings and at least two discharge openings per row.

23. The automated kitchenware washing tank of Claim 22 further comprising a control system having a controller coupled to the pump system for causing the pump to pump fluid at least two different flow rates through the outlets, and a control to allow selecting between the at least two different flow rates.

24. An automated kitchenware washing tank comprising:

A tank having a wall defining an enclosure for holding a fluid for washing kitchenware;

Discharge openings in the wall for directing fluid into the tank;

5 An intake opening in the tank;

A pump system comprising a pump and fluid conduit system coupling the pump between the intake opening and the discharge openings to pump fluid from within the tank through the intake opening into the pump system and through the discharge openings into the tank.

25. The automated kitchenware washing tank of Claim 24 wherein the tank wall comprises a bottom wall and an enclosure wall extending upwardly from the bottom wall, the enclosure wall having at least one angled portion and at least some of the discharge openings being located on the angled portion.

26. The automated kitchenware washing tank of Claim 25 wherein the enclosure wall of the tank has at least two opposed angled portions with at least some of the discharge openings are located in each of the angled portions of the wall to direct the fluid generally downwardly into the tank.

27. The automated kitchenware washing tank of Claim 26 wherein all of the discharge openings are located in the angled portions of the enclosure wall.

28. The automated kitchenware washing tank of Claim 27 wherein each angled portion of the enclosure wall has at least two rows of discharge openings and at least two discharge openings per row.

29. The automated kitchenware washing tank of Claim 28 wherein the angled portions are at angles that cause the discharge openings to emit the fluid into the tank in a crossing pattern.

30. The automated kitchenware washing tank of Claim 29 further comprising an overflow formed in the enclosure wall by an elongated cutaway portion near the top of the enclosure wall.

31. The automated kitchenware washing tank of Claim 25 further comprising an overflow formed in the enclosure wall by an elongated cutaway portion near the top of the enclosure wall.

32. An automated kitchenware washing tank comprising:

A tank having a wall defining an enclosure for holding a fluid for washing kitchenware;

outlets in the wall for directing fluid into the tank;

5 an intake opening in the tank;

A pump system comprising a pump and fluid conduit system coupling the pump between the intake opening and the outlets to pump fluid from within the tank through the intake opening into the fluid conduit system and through the outlets into the tank;

10 A cleaner dispensing system for automatically dispensing cleaner into the fluid; and

A control system coupled to the cleaner dispenser for automatically causing the cleaner dispenser to dispense cleaner into the fluid.

33. The automated kitchenware washing tank of Claim 32 further comprising
a fluid level sensor for sensing the level of fluid in the tank, the fluid level sensor
being interfaced to the control system to cause the cleaner dispensing system to
dispense cleaner into the fluid after the fluid level sensor senses that the tank has been
5 filled with fluid above a desired level.

34. The automated kitchenware washing tank of Claim 33 wherein the cleaner
dispenser includes a dispensing outlet that is coupled to the pump system to dispense
cleaning agent into the pump system.

35. An automated kitchenware washing tank comprising:

A tank having a wall defining an enclosure for holding a fluid for washing
kitchenware;

Outlets, on at least two portions of the wall separated by an angle greater than
5 45 degrees, for directing fluid into the tank in opposed directions to create turbulence
in the tank;

An intake opening in the tank; and

A pump system comprising a pump and fluid conduit system coupling the
pump between the intake opening and the outlets, whereby the pump is adapted to
10 pump fluid from within the tank through the intake opening into the pump system and
through the outlets into the tank.

36. The automated kitchenware washing tank of Claim 35 wherein the tank
wall comprises a bottom wall and at least four upward walls forming an enclosure
wall that extends upwardly from the bottom wall, and wherein the outlets being on at
least two of the upward walls.

37. The automated kitchenware washing tank of Claim 36 wherein the outlets
are on first and second opposed upward walls and the first and second opposed walls

have portions angled generally downwardly into the tank and at least some of the outlets are on the angled portions to direct fluid generally downwardly into the tank to
5 create a crossing pattern.

38. The automated kitchenware washing tank of Claim 37 wherein the outlets on the first opposed wall are offset from the outlets on the second opposed wall.

39. The automated kitchenware washing tank of Claim 38 wherein the outlets are discharge openings and wherein the first and second opposed walls include angled portions and at least some of the discharge openings are formed in the angled portions of the first and second opposed walls.

40. A method of washing kitchenware comprising placing the kitchenware in a tank having a bottom and an enclosure wall for holding fluid, the enclosure wall having at least one generally downwardly facing portion, a plurality of outlets, at least some of which are on the at least one downwardly facing portion, and circulating fluid
5 from the tank and ejecting it through the outlets into the tank.

41. The method of washing kitchenware of Claim 40 further comprising cleaning the kitchenware through a preset program using a control system to automatically cause the preset program to be executed in the tank, the preset program including at least two time cycles during which the flow rate of the fluid through the
5 outlets is different.

42. The method of washing kitchenware of Claim 40 further comprising detecting when the fluid level has dropped below a predetermined level and automatically injecting cleaner into the fluid after detecting that the tank has been refilled.

43. The method of washing kitchenware of Claim 40 wherein the enclosure wall having two generally downwardly facing portions that are generally opposed and

a plurality of outlets and circulating fluid from the tank and ejecting it through the outlets.

44. The method of washing kitchenware of Claim 43 wherein the outlets are discharge openings.

45. The method of washing kitchenware of Claim 44 wherein the generally downwardly facing portions are at an angles between about 60 and 80 degrees from the horizontal.

46. The method of washing kitchenware of Claim 44 wherein generally downwardly facing portions are at an angle of about 75 degrees from the horizontal.